OIPE
NOV 09 2007
PATENT & TRADEMARK OFFICE

A Sine Wave And Its Corresponding Vector Notation

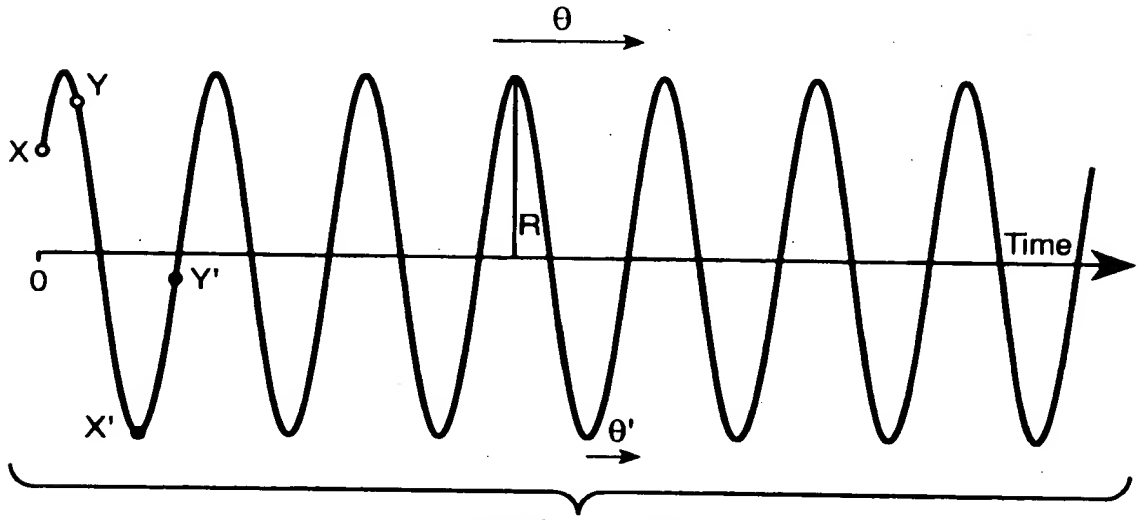


FIG._16

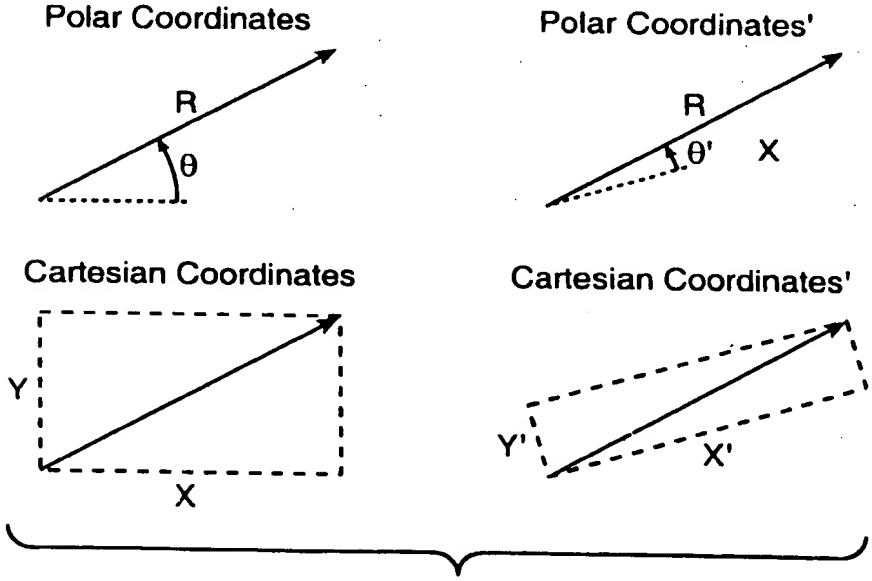


FIG._17

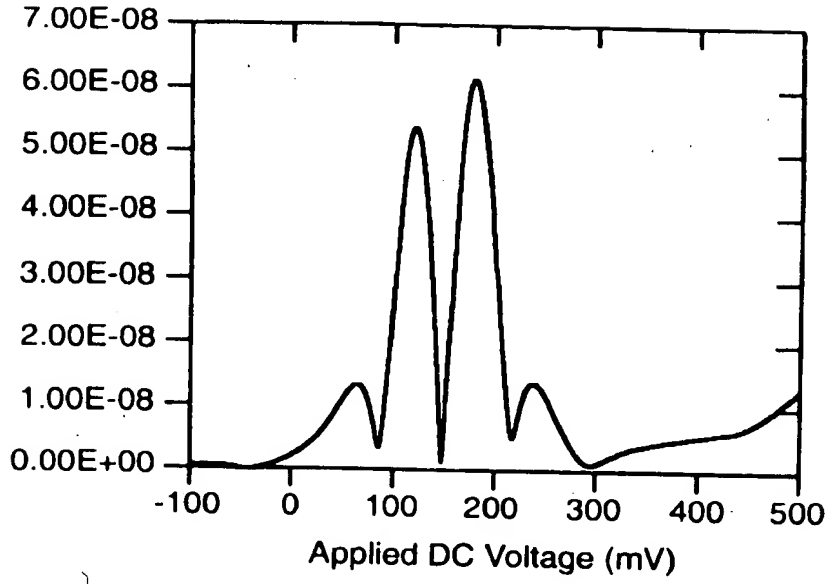


FIG._18

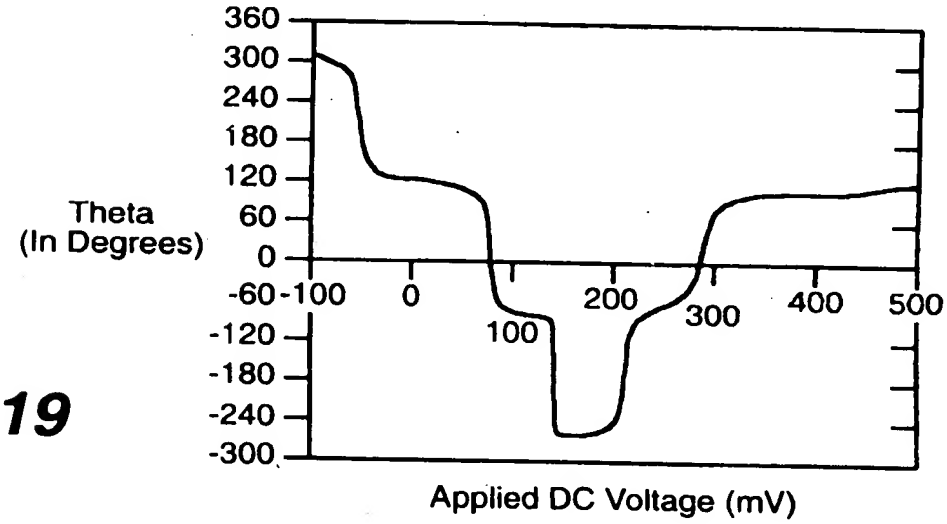


FIG._19

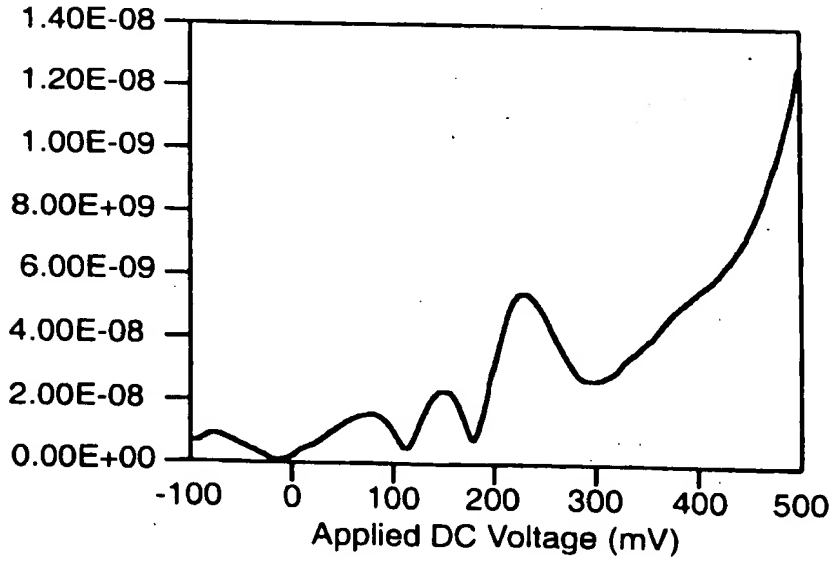


FIG._20

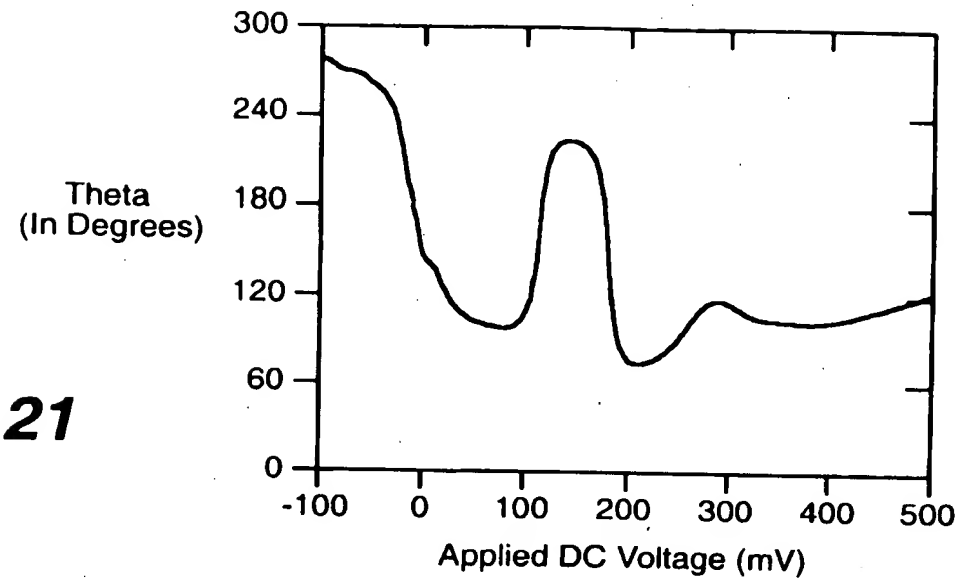


FIG._21

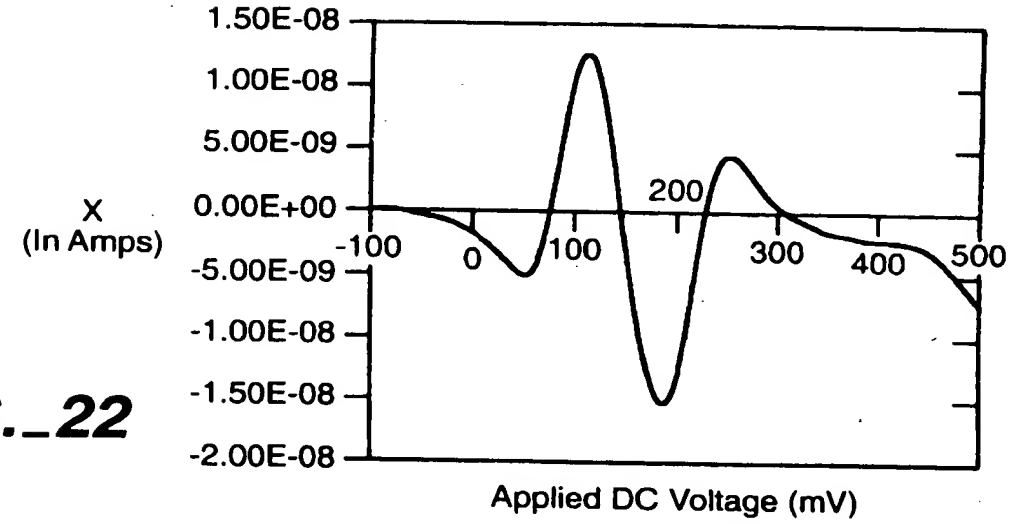


FIG._22

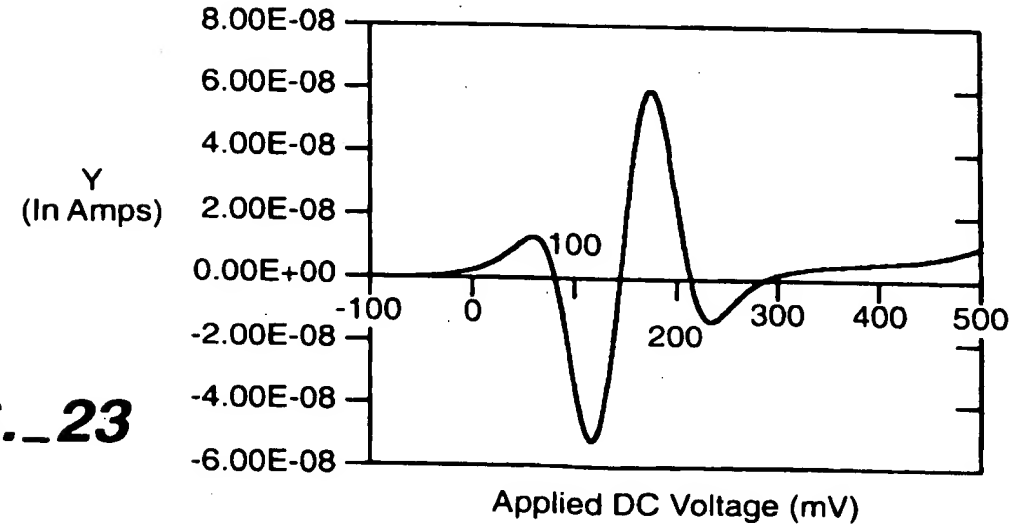


FIG._23

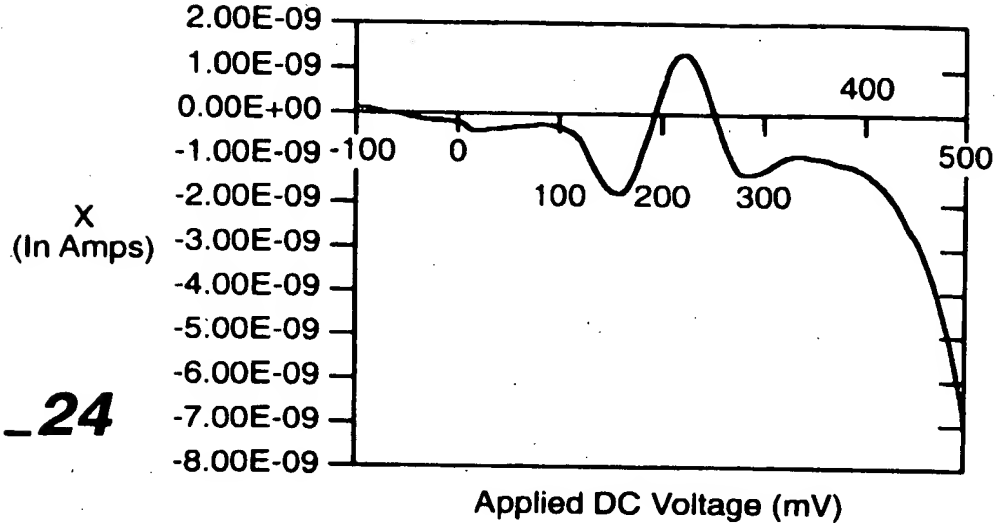

2.00E-09
1.00E-09
0.00E+00
-1.00E-09
-2.00E-09
-3.00E-09
-4.00E-09
-5.00E-09
-6.00E-09
-7.00E-09
-8.00E-09
X
(In Amps)
-100
0
100
200
300
400
500
Applied DC Voltage (mV)

FIG._24

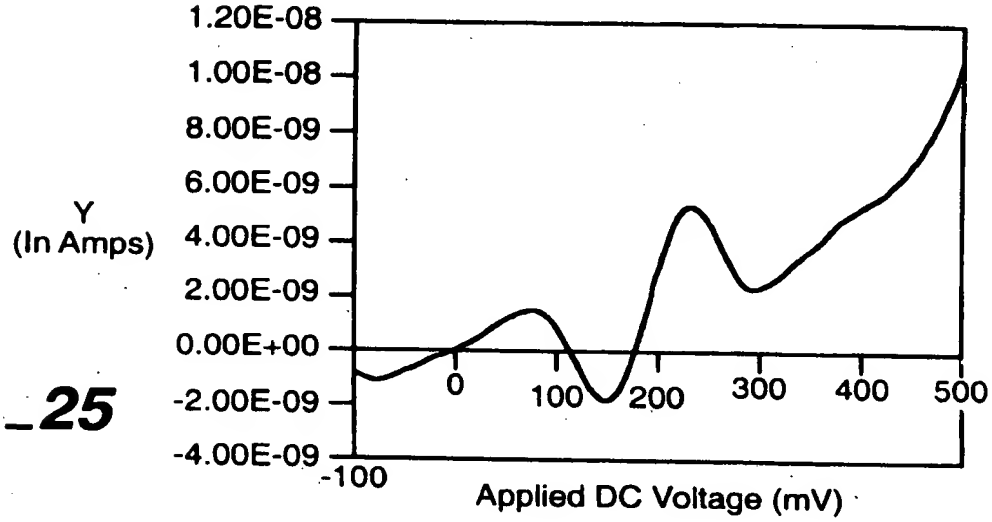

1.20E-08
1.00E-08
8.00E-09
6.00E-09
4.00E-09
2.00E-09
0.00E+00
-2.00E-09
-4.00E-09
Y
(In Amps)
-100
0
100
200
300
400
500
Applied DC Voltage (mV)

FIG._25

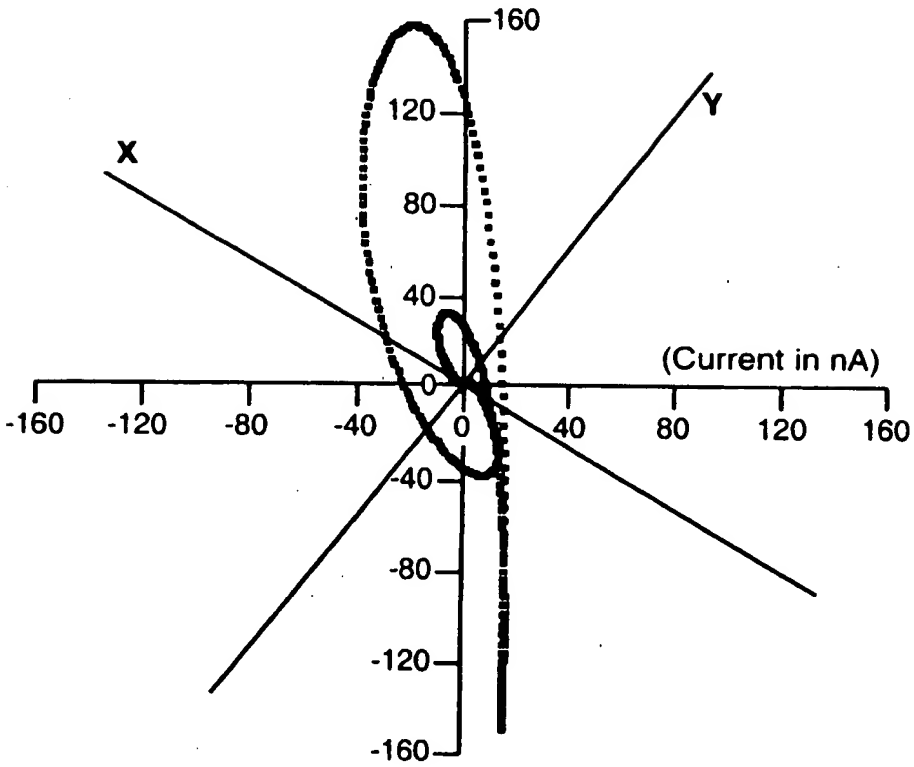

160
120
80
40
0
-40
-80
-120
-160
X
Y
(Current in nA)
-160
-120
-80
-40
0
40
80
120
160

FIG._26

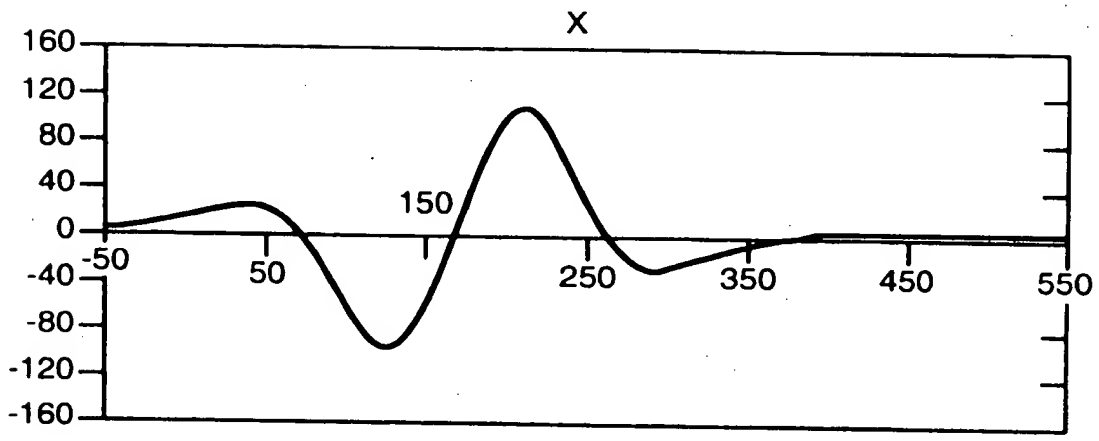


FIG._27

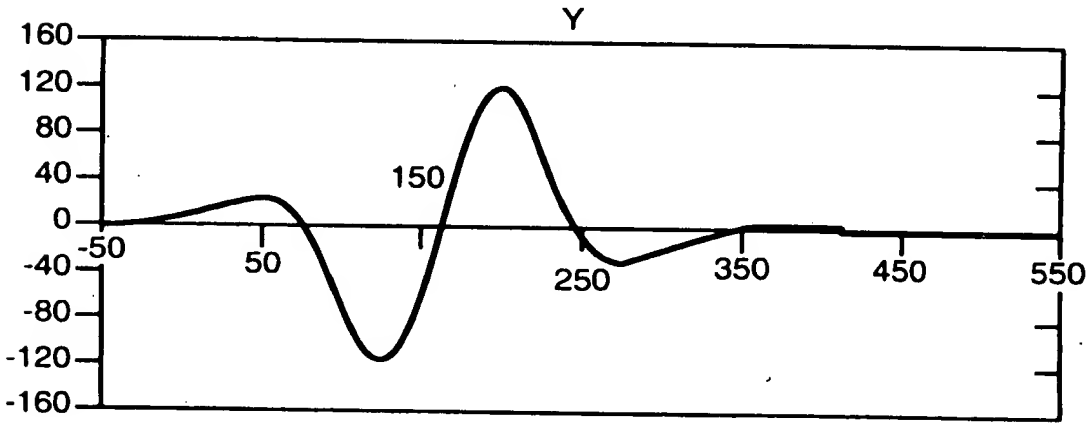


FIG._28

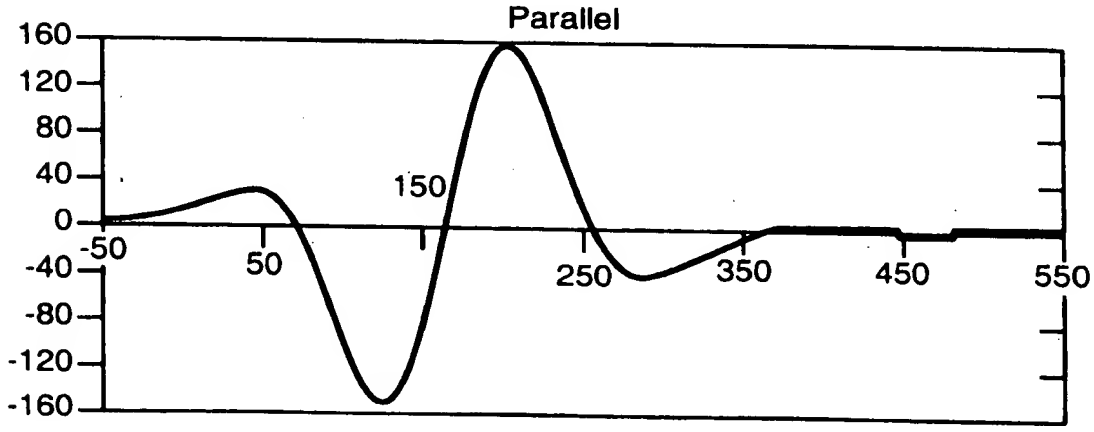


FIG._29

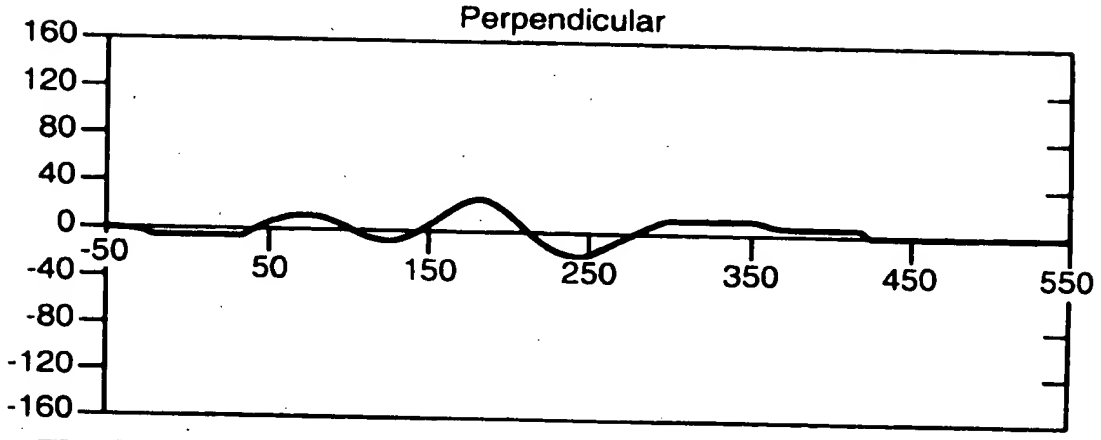


FIG._30

FIG._31

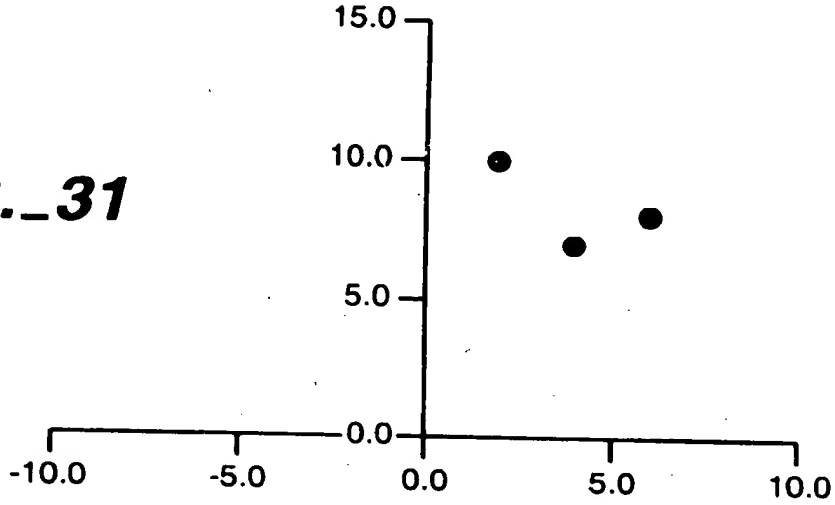


FIG._32

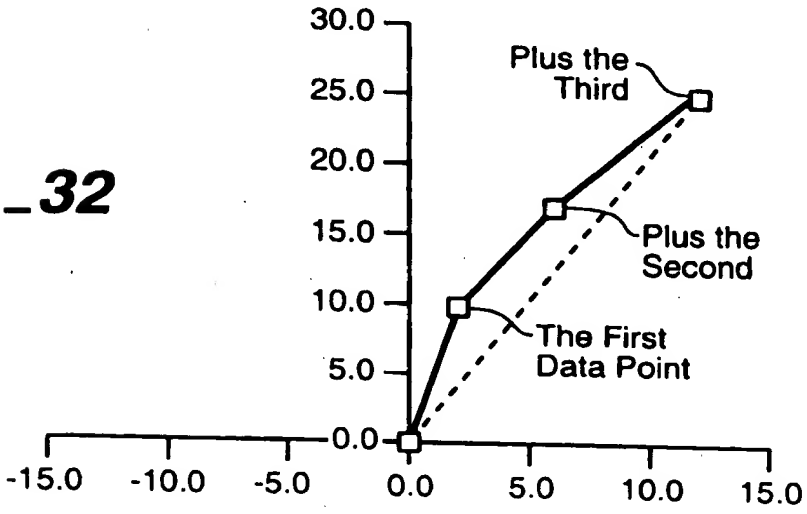


FIG._33

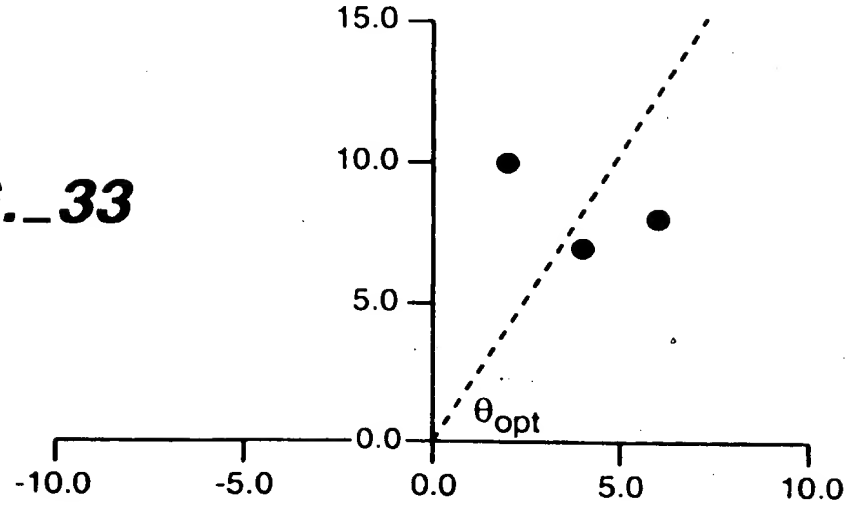


FIG._34

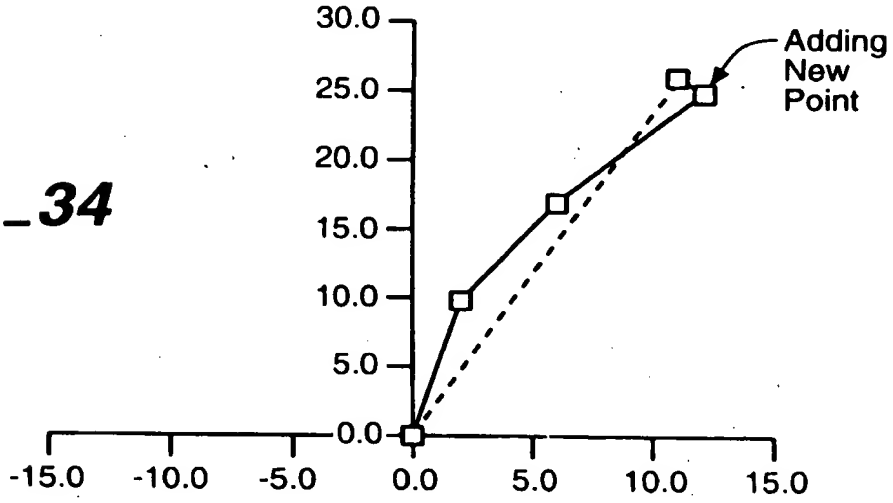
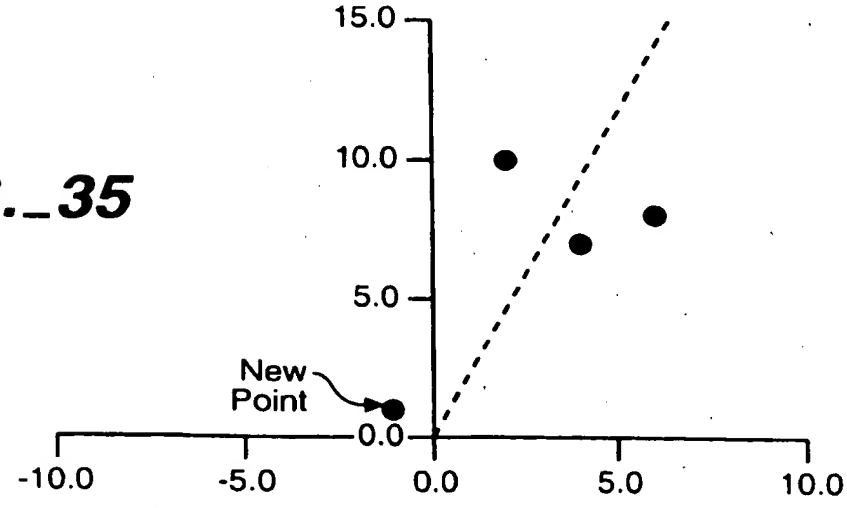


FIG._35



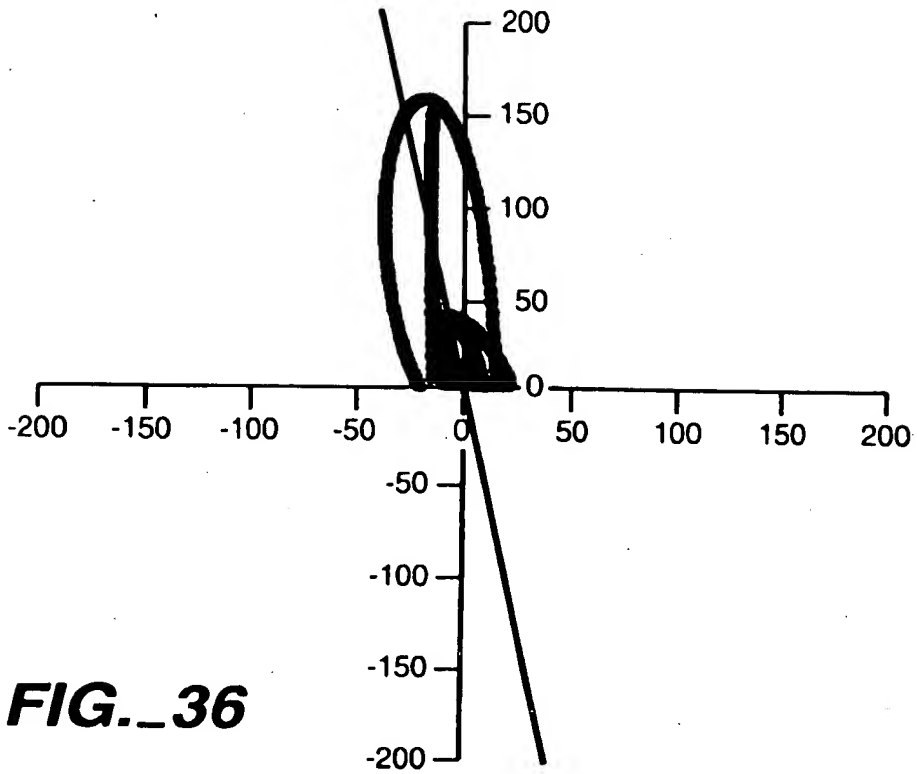

200
150
100
50
0
-200
-150
-100
-50
0
50
100
150
200
-50
-100
-150
-200

FIG._36

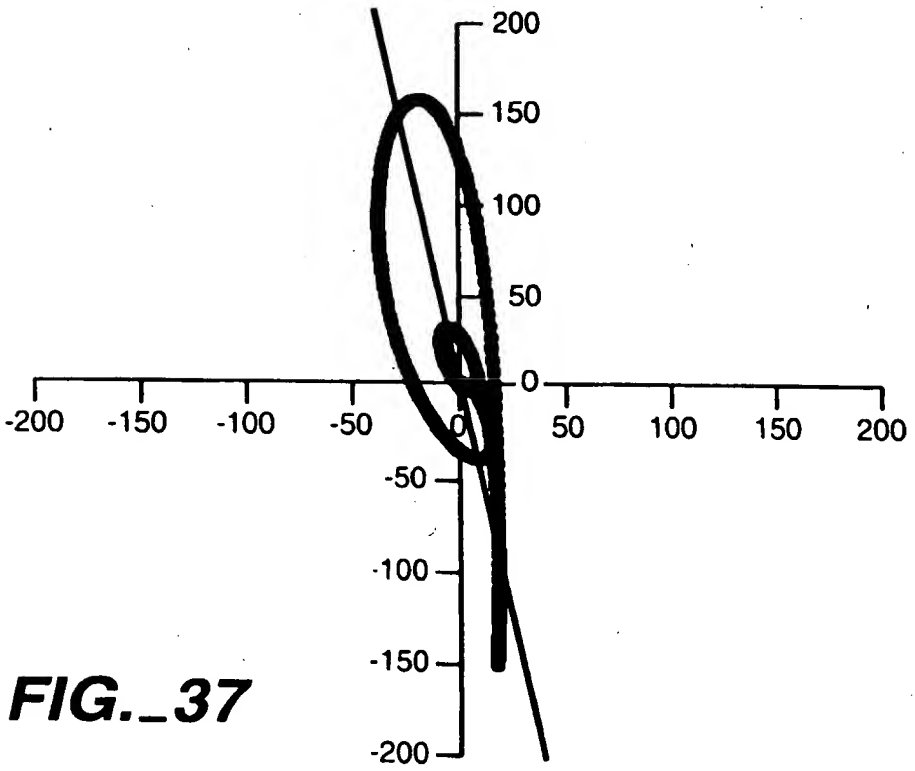

200
150
100
50
0
-200
-150
-100
-50
0
50
100
150
200
-50
-100
-150
-200

FIG._37

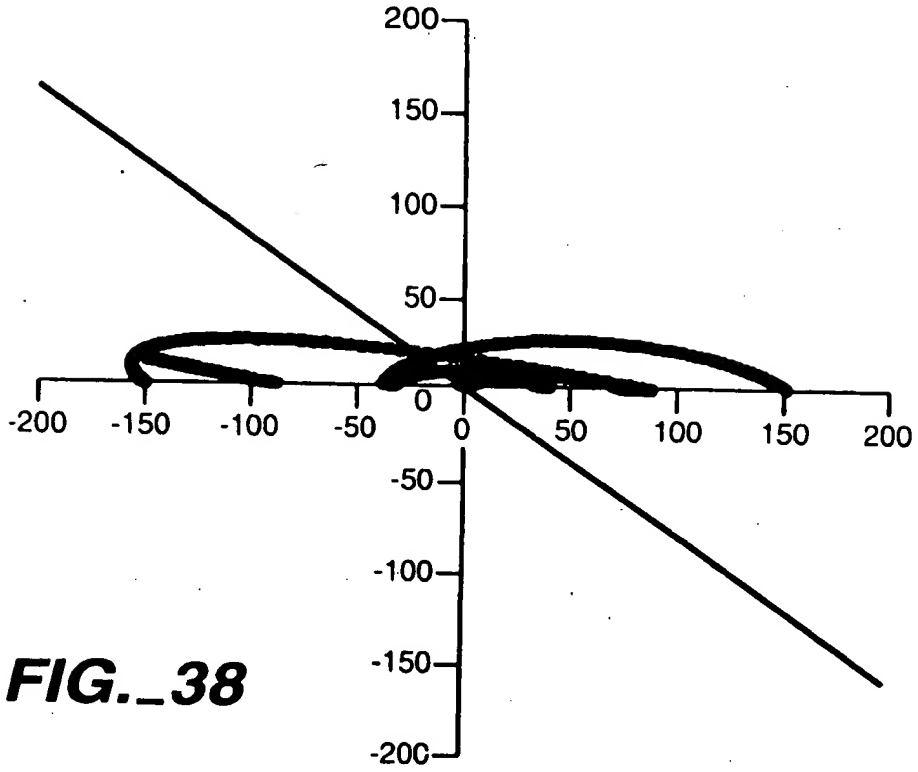

200
150
100
50
0
-50
-100
-150
-200
-200
-150
-100
-50
0
50
100
150
200

FIG._38

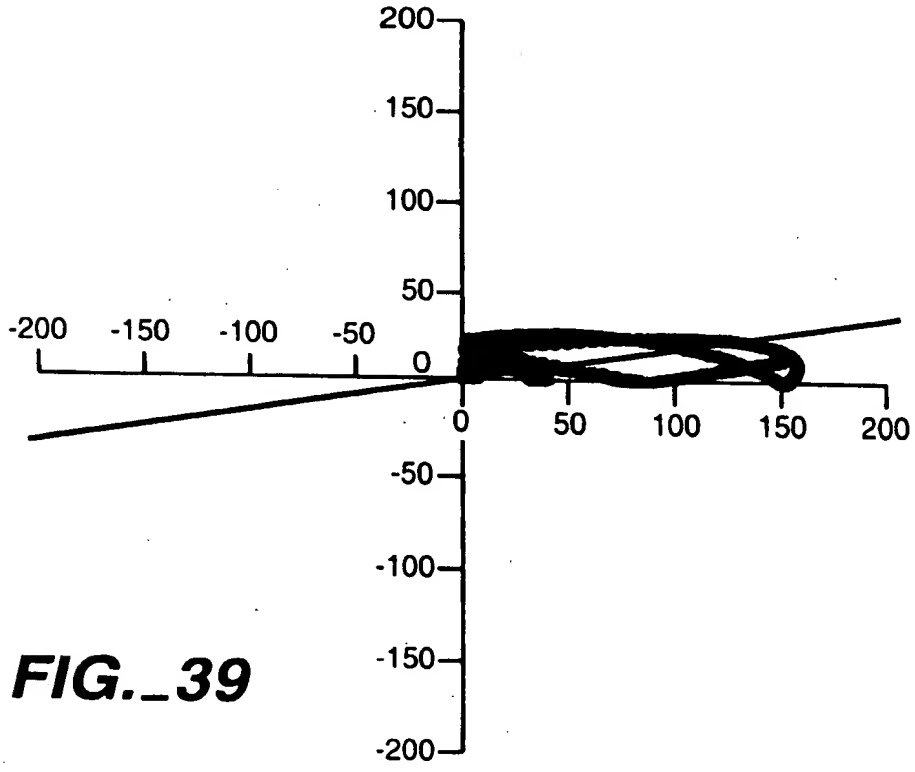

200
150
100
50
0
-50
-100
-150
-200
-200
-150
-100
-50
0
50
100
150
200

FIG._39

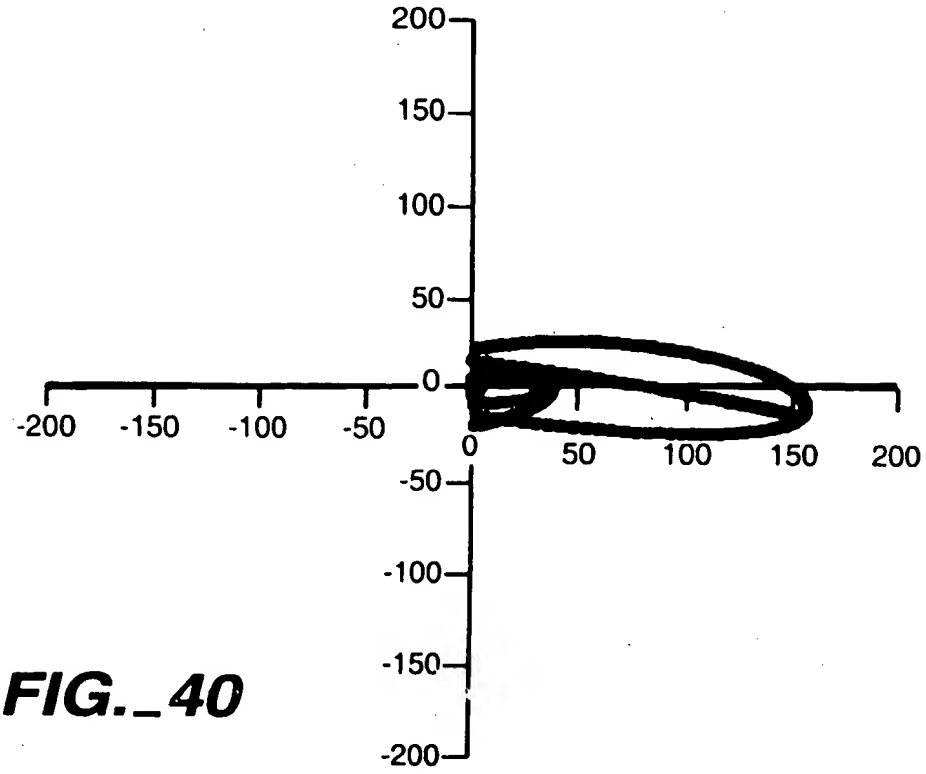

200
150
100
50
0
-50
-100
-150
-200
-200
-150
-100
-50
0
50
100
150
200

FIG._40

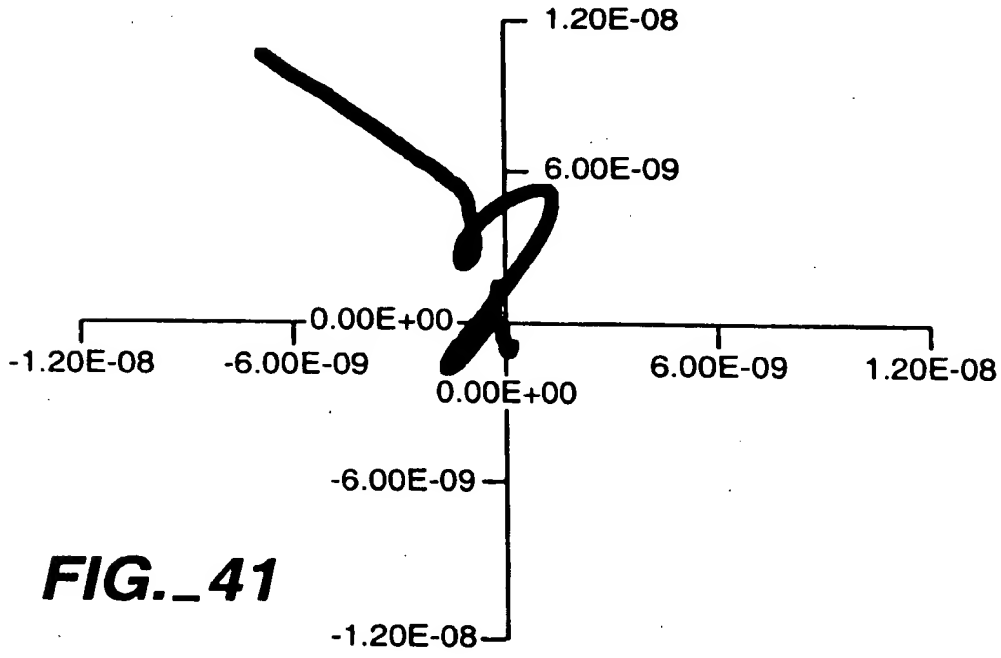

1.20E-08
6.00E-09
0.00E+00
-6.00E-09
-1.20E-08
-1.20E-08
-6.00E-09
0.00E+00
6.00E-09
1.20E-08

FIG._41

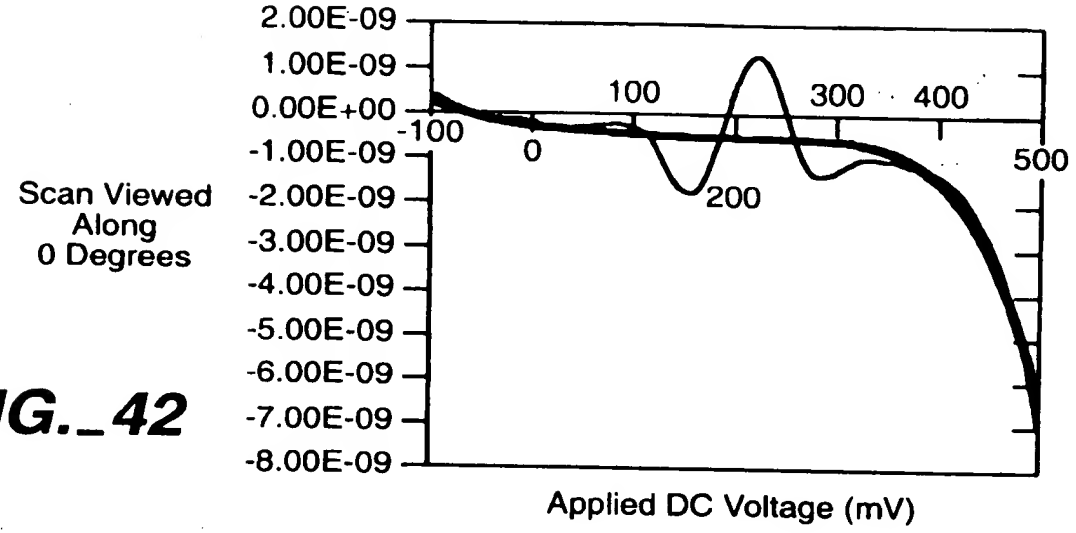


FIG._42

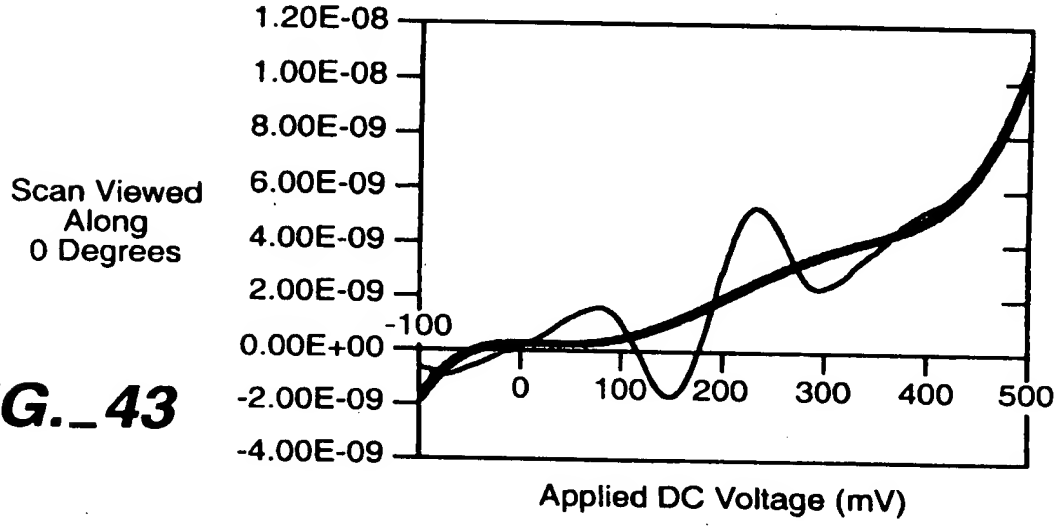


FIG._43

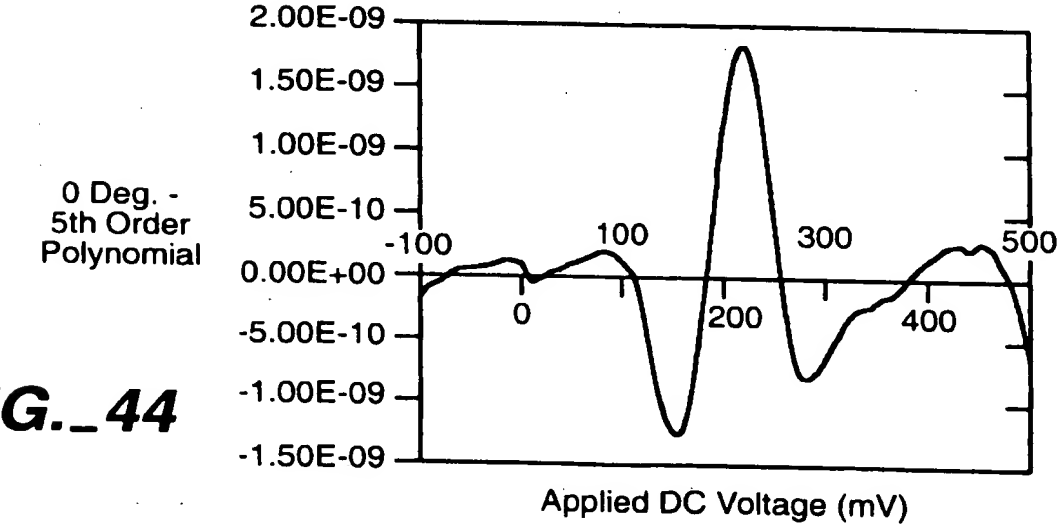


FIG._44

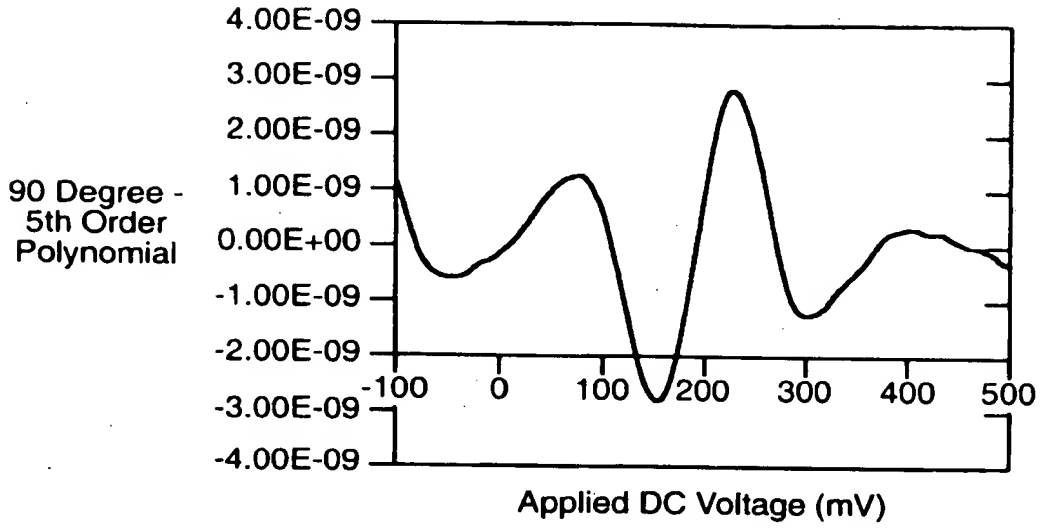

4.00E-09
3.00E-09
2.00E-09
1.00E-09
0.00E+00
-1.00E-09
-2.00E-09
-3.00E-09
-4.00E-09
90 Degree - 5th Order Polynomial
-100
0
100
200
300
400
500
Applied DC Voltage (mV)

FIG._45

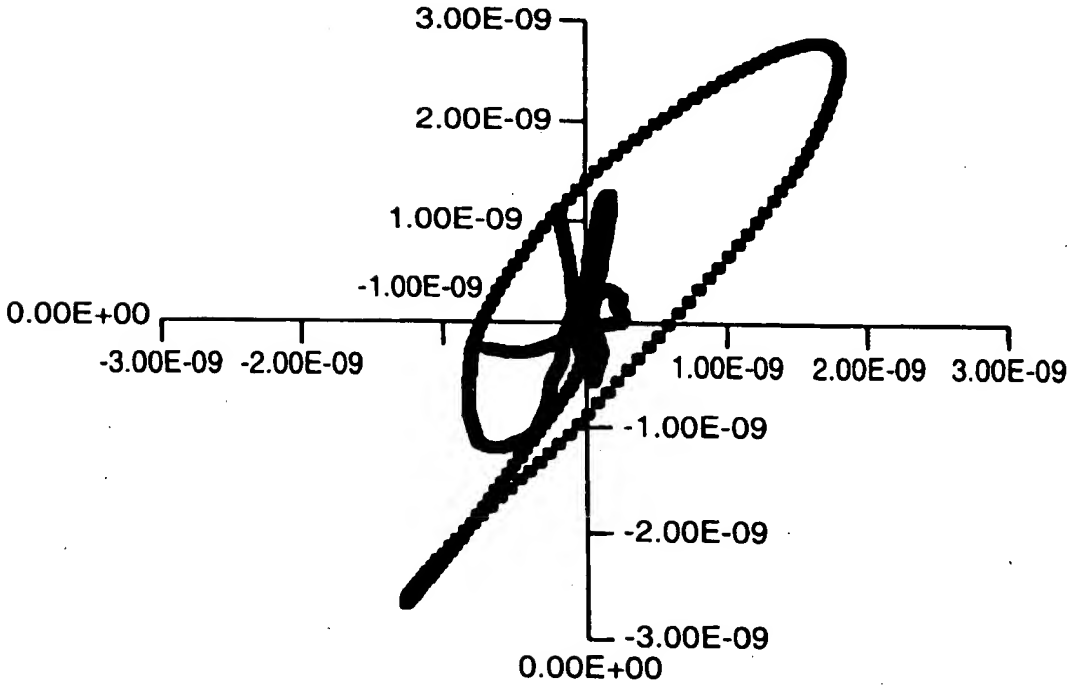

3.00E-09
2.00E-09
1.00E-09
-1.00E-09
0.00E+00
-3.00E-09
-2.00E-09
1.00E-09
2.00E-09
3.00E-09
-1.00E-09
-2.00E-09
-3.00E-09
0.00E+00

FIG._46

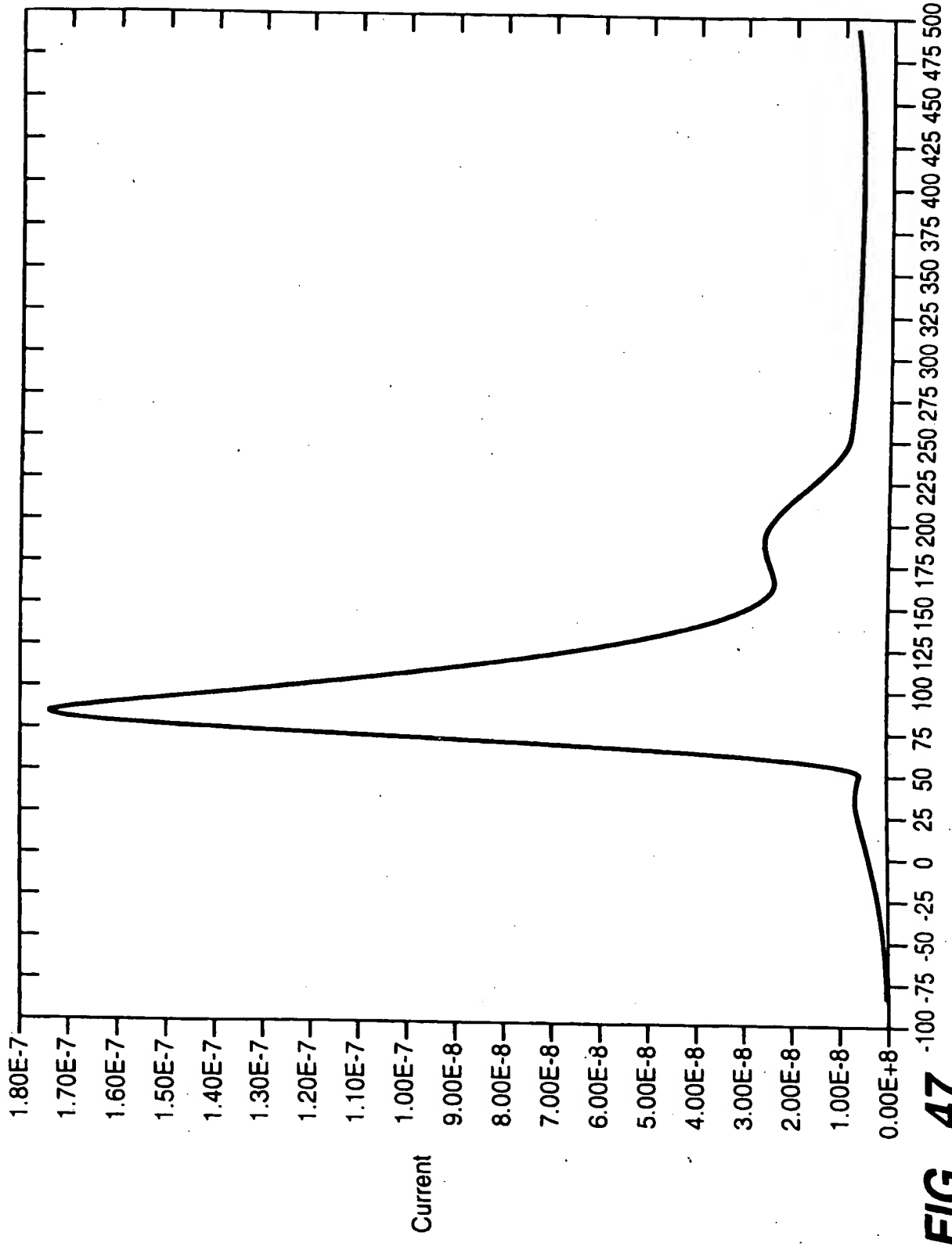

Current
1.80E-7
1.70E-7
1.60E-7
1.50E-7
1.40E-7
1.30E-7
1.20E-7
1.10E-7
1.00E-7
9.00E-8
8.00E-8
7.00E-8
6.00E-8
5.00E-8
4.00E-8
3.00E-8
2.00E-8
1.00E-8
0.00E+8
-100 -75 -50 -25 0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500

FIG._47

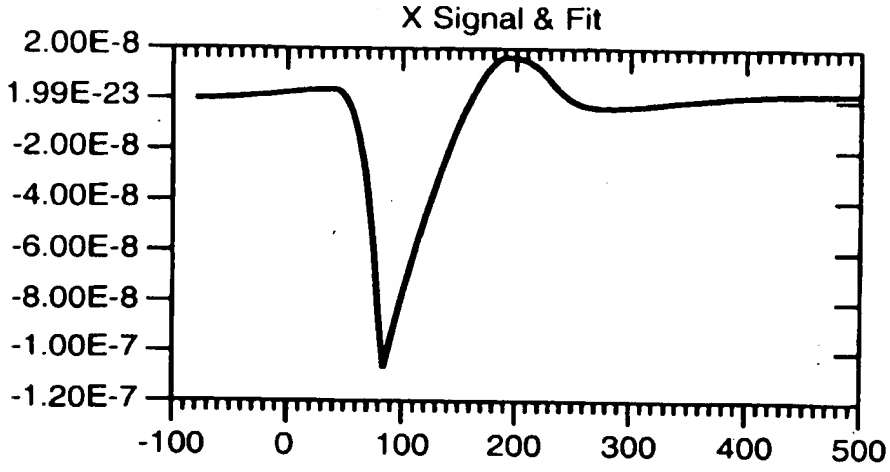


FIG._48

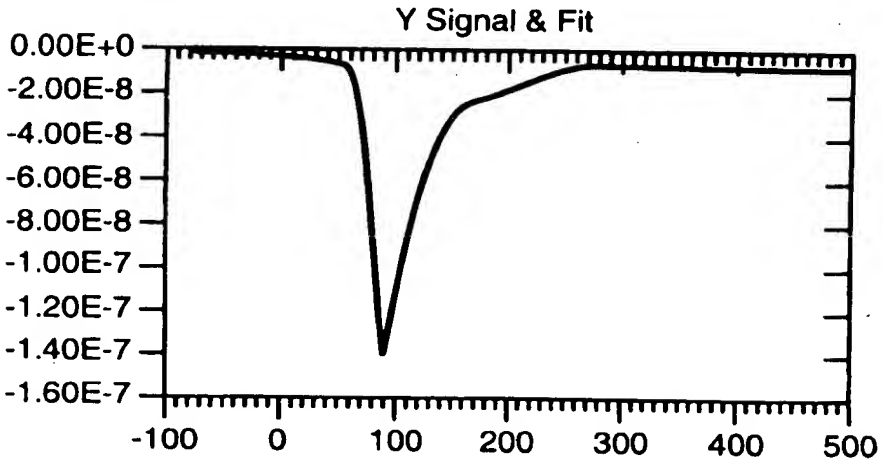


FIG._49

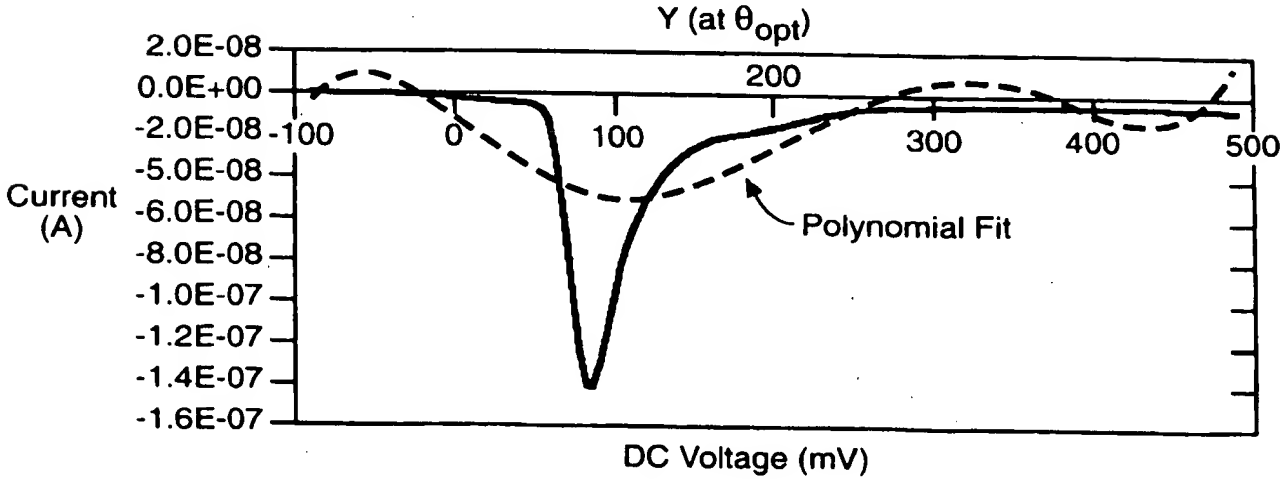


FIG._50

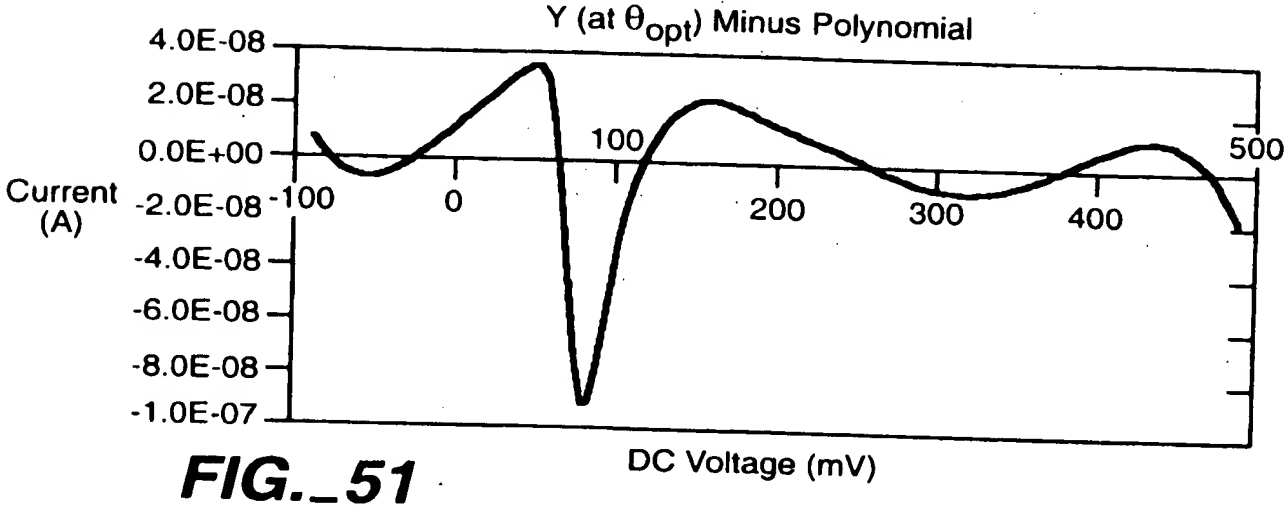

Y (at θ_{opt}) Minus Polynomial
4.0E-08
2.0E-08
0.0E+00
-2.0E-08
-4.0E-08
-6.0E-08
-8.0E-08
-1.0E-07
Current (A)
-100
0
100
200
300
400
500
DC Voltage (mV)

FIG._51

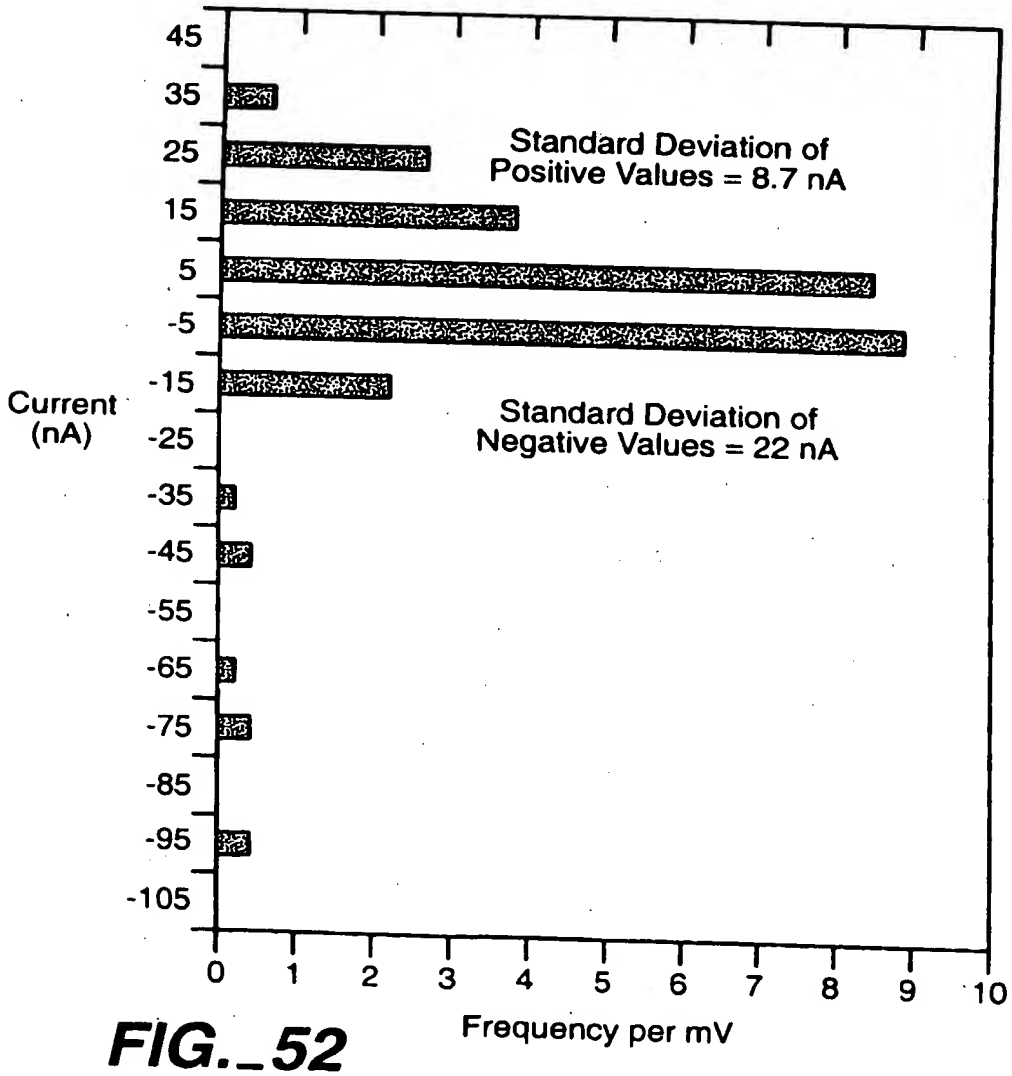

45
35
25
15
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
-105
Current (nA)
Standard Deviation of Positive Values = 8.7 nA
Standard Deviation of Negative Values = 22 nA
0
1
2
3
4
5
6
7
8
9
10
Frequency per mV

FIG._52

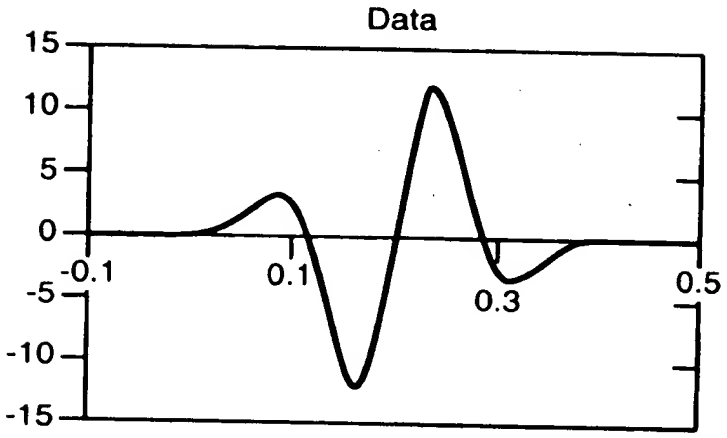

Data
15
10
5
0
-5
-10
-15
-0.1
0.1
0.3
0.5

FIG._53

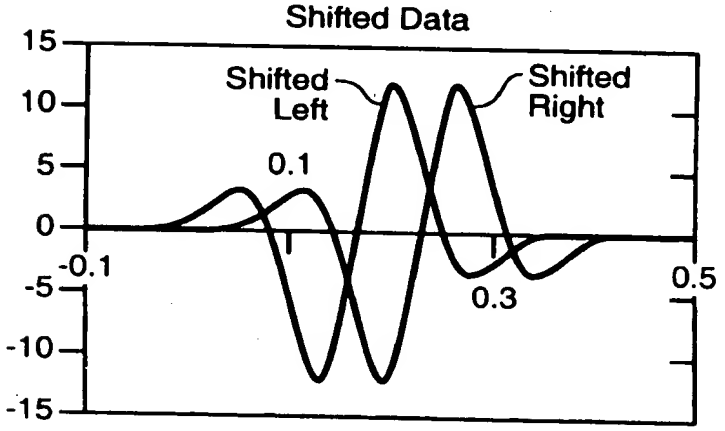

Shifted Data
15
10
5
0
-5
-10
-15
Shifted Left
Shifted Right
0.1
-0.1
0.3
0.5

FIG._54

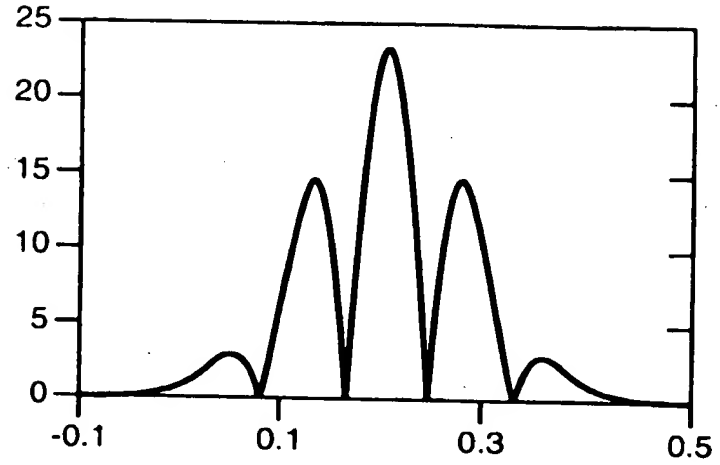


FIG._55

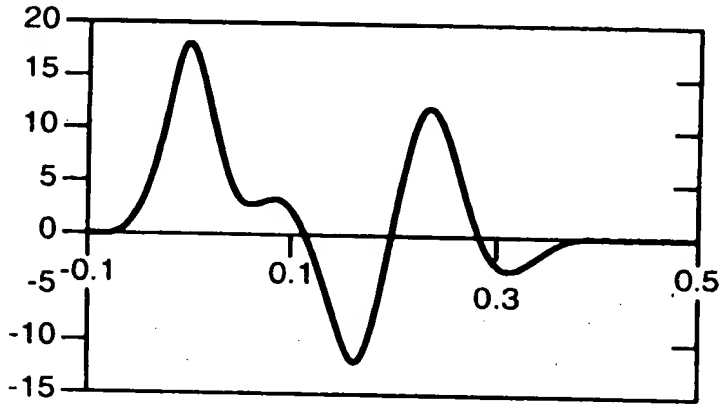


FIG._56

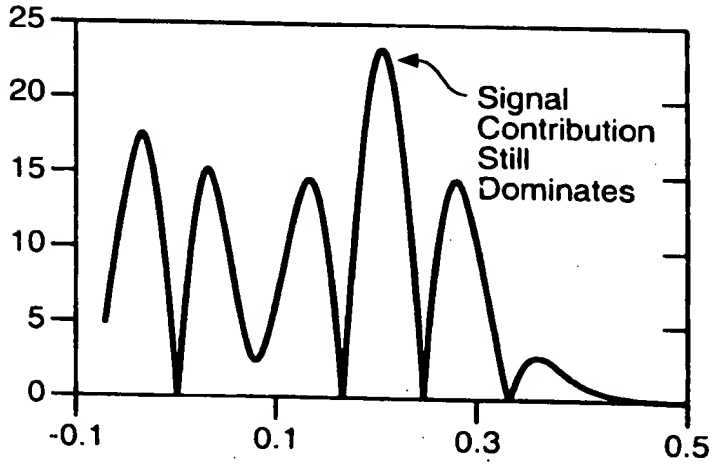


FIG._57

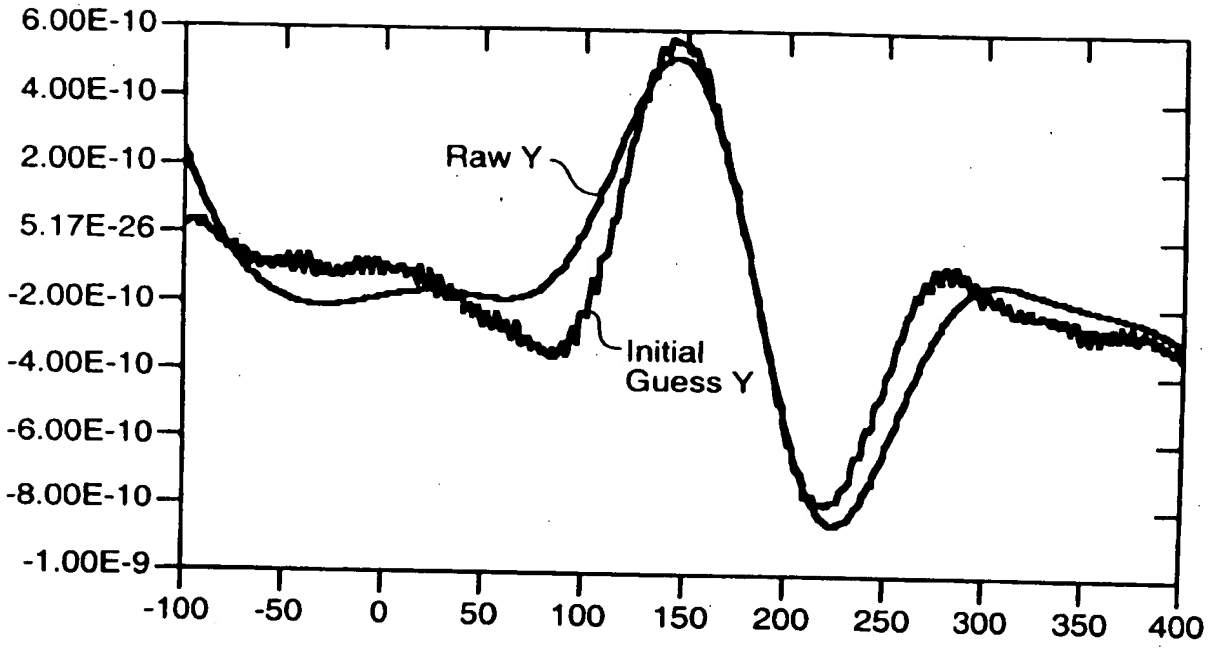

6.00E-10
4.00E-10
2.00E-10
5.17E-26
-2.00E-10
-4.00E-10
-6.00E-10
-8.00E-10
-1.00E-9
Raw Y
Initial
Guess Y
-100
-50
0
50
100
150
200
250
300
350
400

FIG._58

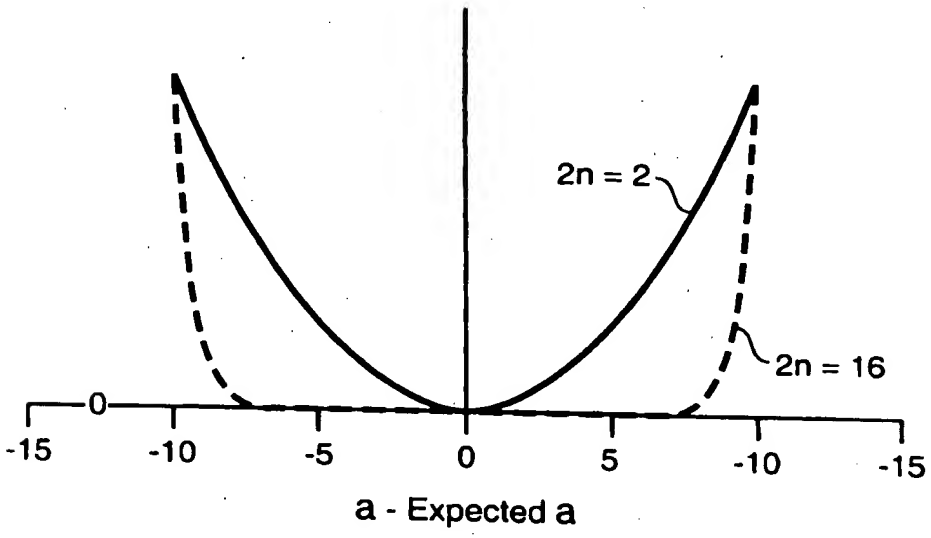

2n = 2
2n = 16
0
-15
-10
-5
0
5
-10
-15
a - Expected a

FIG._59

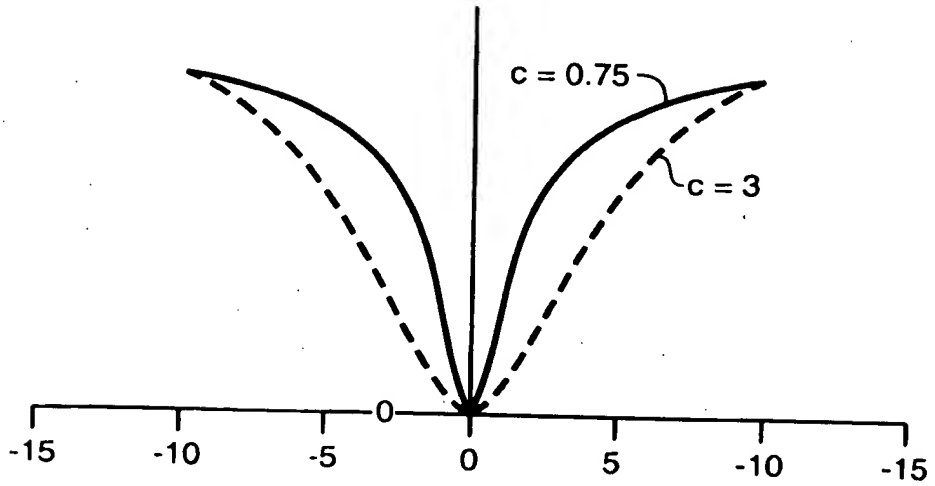

c = 0.75
c = 3
0
-15
-10
-5
0
5
-10
-15
a - Expected a

FIG._60

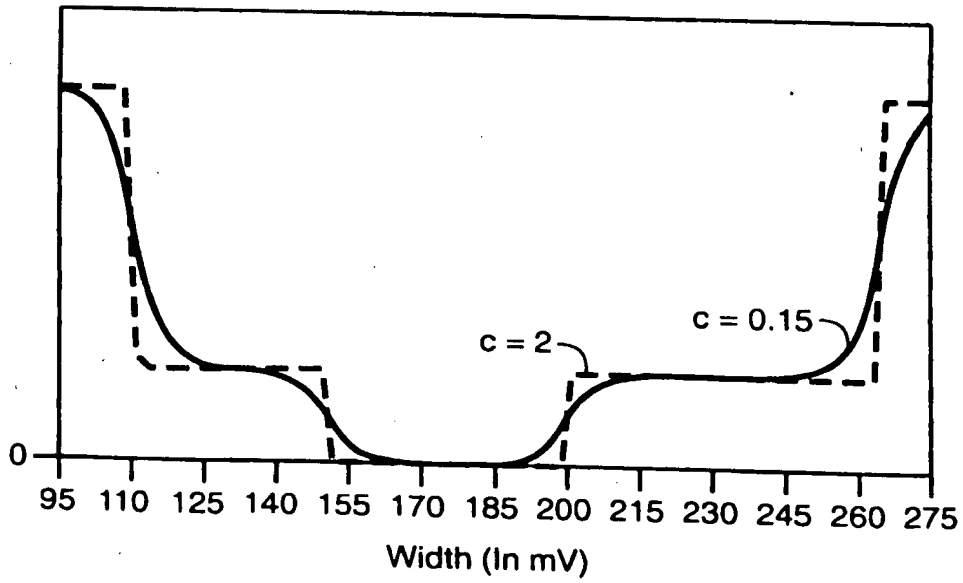

c = 0.15
c = 2
0
95 110 125 140 155 170 185 200 215 230 245 260 275
Width (In mV)

FIG._61

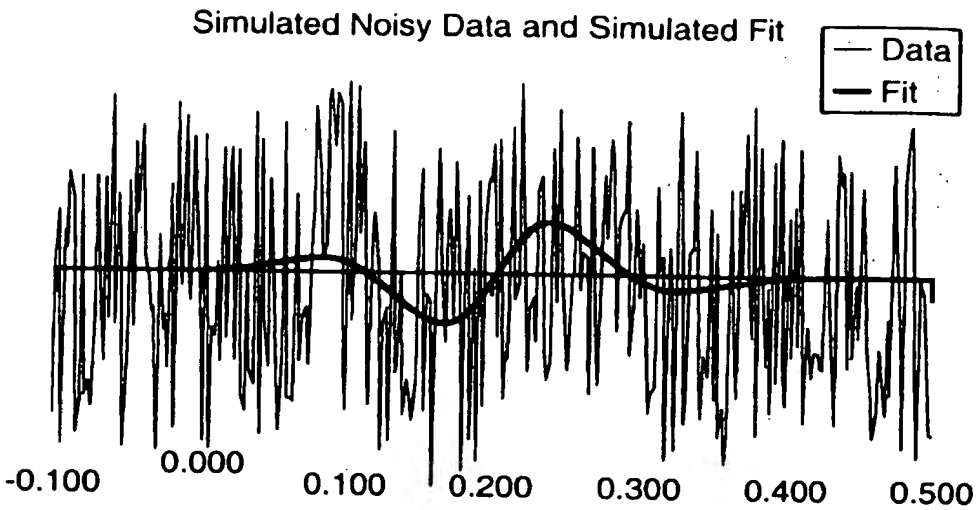


FIG._62

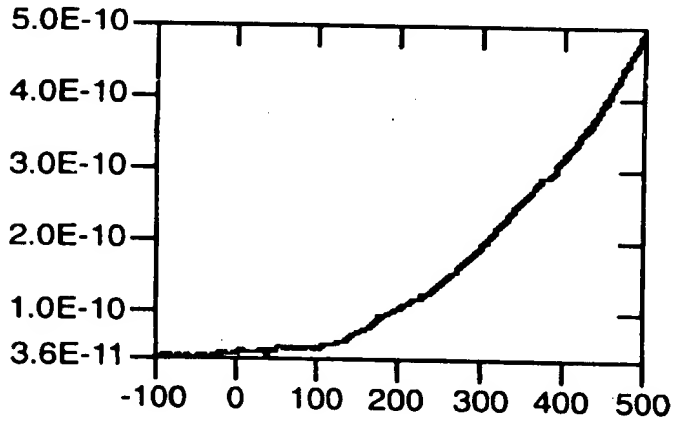


FIG._63

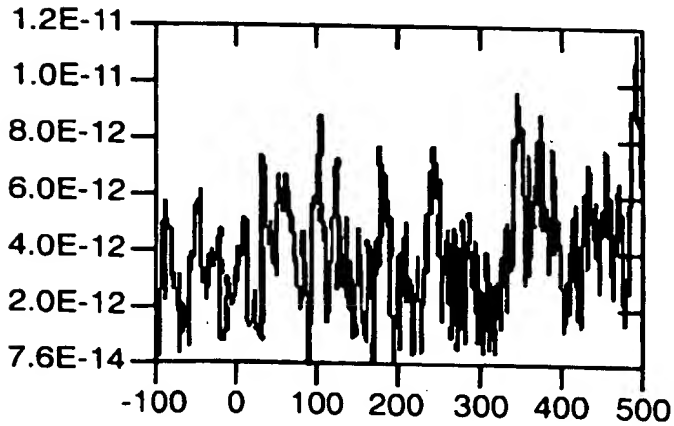


FIG._64

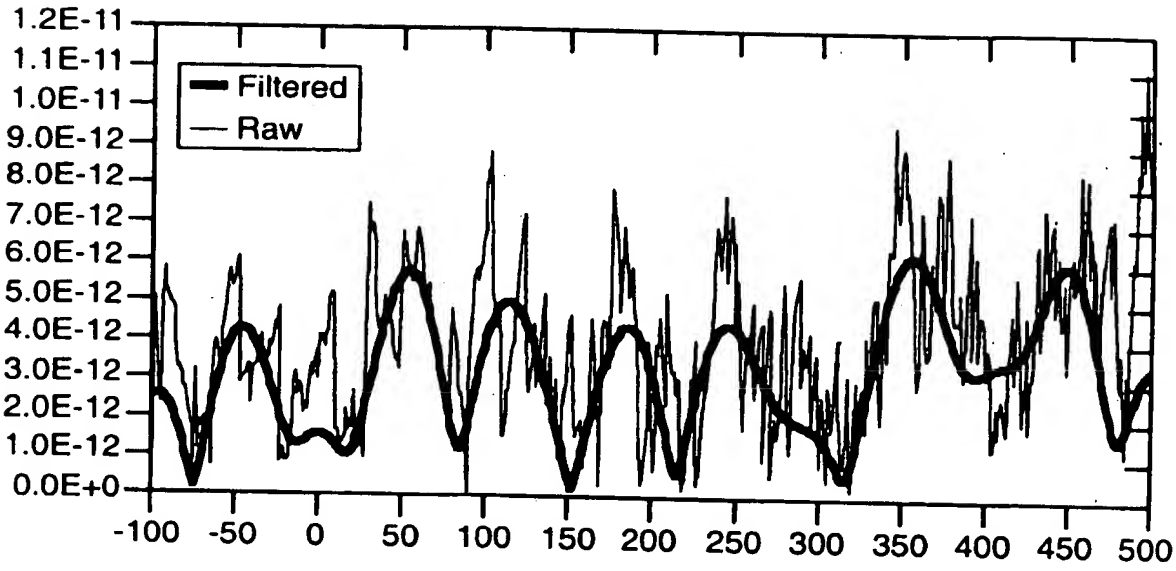


FIG._65

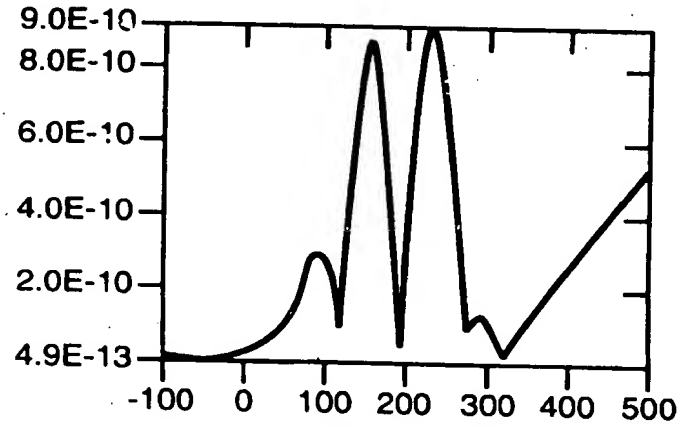


FIG._66

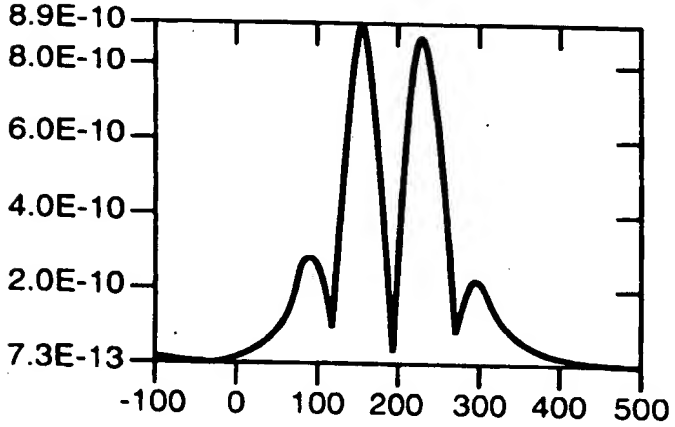


FIG._67